PETITION

To the Commissioner of Patents and Trademarks
Washington, D.C. 20231

Your Petitioner, TIMOTHY J. RAYMOND, a citizen of the United States and a resident of the State of Florida, whose post office address is 4052 Southwell Way, Sarasota, Florida 34241, prays that Letters Patent may be granted to him for the improvement in

A TELESCOPIC BOOM-MOUNTED
CONCRETE PUMP APPARATUS

as set forth in the following specification.

CROSS-REFERENCE TO RELATED APPLICATION

This is a continuation-in-part application of Petitioner's earlier application Serial No. 10/045,106 filed January 7, 2002, entitled "A TELESCOPIC BOOM-MOUNTED CONCRETE PUMP APPARATUS".

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

This invention relates to a concrete pump apparatus and more particularly to a telescopic boom-mounted concrete pump apparatus. Even more particularly, the apparatus includes a concrete discharge conduit in the form of a rigid jib boom member which is mounted on the outer end of the boom assembly. The rigid jib boom member is secured to and positioned within a lattice truss. A winch is secured to the outer end of the lattice truss.

2. DESCRIPTION OF THE RELATED ART

Concrete is sometimes pumped to locations where it is difficult or impossible for a concrete mixer truck to gain access thereto. Such is the case where concrete is to be poured behind a house or the like where it is impossible to drive the concrete mixer truck. One alternative to such a situation is to use wheelbarrows to transport the concrete to the location where it is to be placed. Another solution has been to utilize a telescoping or articulated boom assembly which is mounted on a truck. In some cases, a concrete pump is positioned on the truck and a concrete conduit, such as a flexible hose, is extended from the pump, along the length of the telescoping boom, at the exterior surface thereof, to a discharge conduit from which the concrete is discharged. The telescoping boom is extended and maneuvered to position the discharge conduit at the proper location.

The assignee of the present invention is the owner of U.S. Patent No. 6,142,180 entitled A CRANE-MOUNTED CONCRETE PUMP APPARATUS as well as U.S. Patent No. 6,220,292 entitled A CRANE-MOUNTED CONCRETE PUMP APPARATUS. In U.S. Patent No. 6,142,180, a flexible hose extends between the discharge side of the concrete pump and the rearward end of the concrete conduit positioned within the telescopic boom assembly. The flexible hose is coiled on the crane platform when not in use. As the telescopic boom is extended, the flexible hose is pulled from the coil of the interior of the boom assembly. When the boom assembly is retracted, it is necessary to pull the hose rearwardly from the interior of the boom assembly and position the same on the crane platform. In U.S. Patent No. 6,220,292, the flexible hose

connecting the concrete pump with the concrete conduit within the boom assembly is wound upon a powered hose reel, rotatably mounted on the rearward end of the boom assembly. An improved telescopic boom-mounted concrete pump apparatus is disclosed in co-pending application Serial No. 10/045,106 filed January 7, 2002. Although both of the above-identified patents represent a significant advance in the art, the invention of the co-pending application eliminates the need for coiling the flexible hose on the crane platform and eliminates the need for a powered hose reel. In addition, the invention of the co-pending application is more maneuverable than the devices of the above-identified patents.

Although the invention of the co-pending application truly represents an improvement in the field, the instant invention is believed to represent an improvement thereover since the jib boom member is strengthened with a lattice truss which also permits a winch to be mounted on the outer end of the truss, providing additional versatility to the apparatus.

SUMMARY OF THE INVENTION

A telescopic boom-mounted concrete pump apparatus is provided with the apparatus being mounted on a truck having a rotatable pedestal assembly mounted thereon rearwardly of the cab of the truck. A telescoping boom assembly is pivotally secured to the pedestal and extends outwardly and normally upwardly therefrom. A hydraulic cylinder pivotally connects the telescoping boom assembly to the pedestal for pivotally moving the telescoping boom assembly with respect to the pedestal. The telescoping boom assembly preferably comprises an inner boom member, an

intermediate boom member slidably mounted in the interior of the inner boom member, and an outer boom member slidably mounted in the interior of the intermediate boom member. For purposes of description, the inner boom member will be described as having inner and outer ends and first and second sides while the intermediate and outer boom members will be described as having inner and outer ends. The outer boom member is movable with the intermediate boom member as the intermediate boom member is retracted and extended.

A first concrete conduit, having inner and outer ends, is positioned at the outer side of the inner boom member with the inner end of the first concrete conduit being positioned at the inner end of the inner boom member. The outer end of the first concrete conduit is positioned at the outer end of the inner boom member. The inner end of the first concrete conduit is in communication with a source of concrete under pressure. One end of a flexible concrete hose is operatively connected to the outer end of the first concrete conduit. A first elongated support is mounted on the inner boom member at the first side thereof. A second elongated support is mounted on the inner boom member at the second side thereof. A third elongated support is movably mounted on the second elongated support and is movable between retracted and extended positions with respect to the second elongated support.

The outer end of the third elongated support is secured to the intermediate boom member so that the third elongated support moves from its retracted position to its extended position as the intermediate boom member is moved from its retracted position to its extended position. The inner end of a second concrete conduit is in fluid

communication with the second end of the flexible concrete hose with the outer end of the second concrete conduit being secured to the outer end of the outer boom member for movement therewith. The second concrete conduit is positioned on the third elongated support when the outer boom member is in its retracted position. The second concrete conduit extends from the outer end of the third elongated support when the outer boom member is in its extended position. The flexible concrete hose is positioned on the first elongated support and at least partially positioned upon the second elongated support when the intermediate and outer boom members are in their retracted positions.

A concrete discharge conduit in the form of a rigid jib boom member is pivotally and rotatably secured to the outer end of the outer boom member and includes a self-aligning mechanism which normally maintains the rigid jib boom member in a pivotal aligned relationship with respect to the truck. A flexible concrete discharge hose is secured to the outer end of the rigid jib boom member. The construction of the apparatus of this invention enables the boom assembly to be moved into low buildings with the jib boom member being able to pivot around pillars, columns or the like. Further, the arrangement of the various components allows concrete to be discharged at a location close to the truck.

The jib boom member is secured to and is positioned within a lattice truss which strengthens the jib boom member and which permits a winch to be mounted on the outer end of the lattice truss thereby creating additional versatility for the apparatus.

It is therefore a principal object of the invention to provide an improved concrete pumping apparatus.

A further object of the invention is to provide a telescopic boom-mounted concrete pump apparatus.

Still another object of the invention is to provide a telescopic boom-mounted concrete pump apparatus wherein the telescopic boom may be extended into low buildings.

Yet another object of the invention is to provide an apparatus of the type described which includes a pivotal jib boom member which may be pivoted around obstructions within the building.

A further object of the invention is to provide an apparatus of the type described which includes a truss reinforced jib boom member or placer jib boom.

A further object of the invention is to provide an apparatus of the type described which includes a truss reinforced jib boom member or placer jib boom thereby enabling a lifting eye or winch to be mounted on the outer end thereof.

These and other objects will be apparent to those skilled in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a rear perspective view of one embodiment of this invention;

Figure 2 is a top view of the apparatus of Figure 1;

Figure 3 is a side view of the apparatus of Figure 1;

Figure 4 is a rear view of the apparatus of Figure 1;

Figure 5 is a rear perspective view of the apparatus of Figure 1 illustrating the intermediate and outer boom members being in an extended position;

Figure 6 is a top view of the apparatus of Figure 5 with the arrows indicating possible movement of the telescopic boom assembly and the jib boom assembly;

Figure 7 is a side view of the apparatus of Figures 5 and 6 with the arrow indicating the upward possible movement of the telescopic boom assembly;

Figure 8 is a rear view of the apparatus of Figure 1 with the telescopic boom in a retracted position and the jib boom member in its stored position;

Figure 9 is a partial perspective view of the apparatus of Figure 1 with the boom member in an extended position and the jib boom in a folded position;

Figure 10 is a rear perspective view of another embodiment of this invention wherein the jib boom member is positioned within and is secured to a lattice truss and which also illustrates a winch mounted on the outer end of the jib boom member;

Figure 11 is a side view of the apparatus of Figure 10;

Figure 12 is a side view of the apparatus of Figure 10 with the jib boom member extended;

Figure 13 is a partial side view of the apparatus of Figure 10 with the jib boom member extended and a winch cable extending downwardly from a winch mounted on the jib boom member;

Figure 14 is a partial side view of the outer end of the jib boom member of the apparatus of Figure 10; and

Figure 15 is a partial exploded perspective view of the outer end of the lattice truss and winch.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A first embodiment of the invention is illustrated in Figures 1-9 and is the embodiment disclosed in co-pending application Serial No. 10/045,106 filed January 7, 2002. Referring to Figures 1-9, the numeral 10 refers to a truck including a wheeled frame means 12 and a cab 14 mounted at the forward end thereof. Platform 16 is provided at the rearward end of the truck. The numeral 18 refers to a conventional crane pedestal which is rotatably mounted on the truck in conventional fashion. Pedestal 18 is positioned on base 19. The numeral 20 refers generally to a telescoping boom assembly which is pivotally mounted at the upper end of the pedestal 18 at 22 and which has a hydraulic cylinder extending therebetween in conventional fashion for pivotally moving the boom assembly 20 with respect to the pedestal 18.

A conventional concrete pump would be mounted at the rear end of the truck and would have a discharge conduit 24 extending therefrom. Concrete conduit 24 extends into the pedestal base 19 at 26 and extends outwardly from the upper end of the pedestal, as seen in the drawings. A swivel connection is provided in the concrete conduit 24 within the pedestal 18 and base 19 to enable the concrete conduit portion 28 to rotate with respect to the concrete conduit 26 within pedestal 18 and base 19. The upper end of concrete conduit portion 28 has a rotational connection 29 aligned with the boom pivot to allow rotational movement of the upper end of the concrete conduit portion 28. The rotational connection 29 is connected to a rigid concrete conduit 30 at

32 with the concrete conduit 30 being supported at one side of the inner boom member 34 of boom assembly 20. The outer end of concrete conduit 30 is connected to one end of a flexible concrete hose 36 by an elbow 38.

When the boom assembly 20 is in its retracted position, as illustrated in Figure 1, a portion of the flexible hose 36 rests in and is supported on an L-shaped support which is operatively secured to the inner boom member 34 by means of cross braces 42 which are secured to inner boom member 34. Elongated support bars 44 are secured to the cross braces 42 and extend along the length of the boom member 34, as illustrated in the drawings. The other end of the flexible concrete hose is connected to a rigid concrete conduit in the form of a metal tube or pipe 46 at 48. A box-shaped frame member 50 is pivotally secured, about a horizontal axis, to the outer end of outer boom member 52 at 54. Outer boom member 52 is telescopically mounted within intermediate boom member 56 which is telescopically received within inner boom member 34 in conventional fashion.

One end of concrete conduit 58 is connected to the end of concrete conduit 46 at 60. The other end of concrete conduit 58 is rotationally connected to concrete conduit 61 by means of swivel joint 59 which is aligned with pivot 54 between the outer boom member 52 and frame member 50. Concrete conduit 61 extends into the outer end of the frame member 50 and is fluidly connected to concrete conduit 62 which extends from frame member 50 by means of a swivel joint connection within frame member 50. A hydraulic cylinder is operatively connected to frame member 50 at 64 and would also be pivotally connected to outer boom member 52 to pivotally move frame member 50

with respect to outer boom member 52. A support assembly 66 is rotatably mounted on the outer end of the frame member 50 so that the support 66 and the concrete conduit 62 may be rotatably moved with respect to the frame member 50 and the boom assembly 20. Concrete conduit 62 is in the form of a jib boom member of metal construction. The outer end of conduit 62 has a flexible discharge hose 68 connected thereto by means of an elbow 70.

The numeral 72 refers to an elongated support which is positioned on the cross braces 42 for movement with inner boom member 34. An elongated support 74 is slidably mounted within the support 72 and has its outer end operatively connected to the outer end of intermediate boom member 56. Thus, as intermediate boom member 56 is moved from its retracted position within inner boom member 34, support 74 moves from its retracted position to its extended position. Preferably, the conduit 46 is provided with a guide or the like which engages the support 74 to maintain the conduit 46 in its proper relationship within support 74.

When the boom assembly is in its retracted position, the flexible hose 36 is generally U-shaped. As the boom assembly is extended, the hose 36 tends to roll or straighten out, thereby effectively increasing the length thereof. In other words, the discharge end of hose 36 moves with concrete conduit 46 as the boom assembly is extended. The rigid concrete conduit connects the hose 36 to the conduit 62. The pivotal and rotation movement of the conduit 62 permits the boom assembly to be extended into low windows or openings in a building with the conduit 62 being able to

pivot or rotate around posts, columns, etc. The apparatus is also able to dump concrete close to the truck if desired.

Figures 10-15 illustrate a second embodiment of the invention and the same reference numerals will be employed in Figures 10-15 as in Figures 1-9. The only differences between the apparatus of Figures 10-15 and the apparatus of Figures 1-9 is the addition of a lattice truss 100 and winch 102 to the concrete conduit 62 (jib boom member) and a change in the design of the support assembly 66.

As seen in Figure 10, the inner end of the lattice truss 100 is secured to the support assembly at 104 and extends outwardly therefrom in a manner which encloses jib boom member 62. Truss 100 is a box-like truss and includes a top truss portion 106, side truss portions 108 and 110, and bottom truss portion 112. Side truss portions 108 and 110 extend between top truss portion 106 and bottom truss portion 112. The outer end of truss 100 is secured to jib boom member 62 by a U-bolt assembly 114. (Figure 14). U-bolt assembly 114 extends around jib boom member 62 and is secured to frame member 116.

A frame member 118 is provided near the outer end of truss 100 (Figure 15) and has mounting brackets 120 and 122 secured thereto adapted to receive lock pins 124 and 126 therein, respectively. Winch support frame 128 support a winch assembly 130 thereon. Winch support frame 128 includes a pair of ears 132 and 134 at its inner end which are adapted to be selectively removably secured to the mounting brackets 120 and 122, respectively, by the lock pins 124 and 126, respectively. The outer end of support frame 128 includes a pair of angles 136 and 138 which are adapted to be

selectively removably secured to the truss 100 by pins 140 and 142, respectively. The structures just described enables the winch assembly 130 to be selectively removably mounted on the outer end of the truss 100 to provide a winch at the outer end of the jib boom member 62. The winch assembly includes a hoisting cable 144 which may be used to maneuver forms, rebars, etc. The truss 100 provides the necessary strength to the jib boom member 62 so that the winch may be supported thereby as well as whatever is being lifted by the hoisting cable 144. The removable aspect of the winch enables the winch to be secured to the jib boom member or removed therefrom as desired.

Thus it can be seen that the invention accomplishes at least all of its stated objectives.